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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

XU, KEVIN K

ART UNIT PAPER NUMBER

2628

DATE MAILED: 08/09/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/539,813	Applicant(s) AKENINE-MOLLER ET AL.	
	Examiner Kevin K. Xu	Art Unit 2628	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 June 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-26 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 June 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date: _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date: _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Objections

Claims 6, 15 and 23 objected to because of the following informalities: Claims recites wherein 'sum "a+b" is in the range 0, 5 – 1, 5.' Based on the specification (p. 6 Fig. 2a, Fig. 2b), applicant intends to affirm 'sum "a+b" is in the range 0.5 – 1.5'. Appropriate correction is required.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 1-26 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. Specifically, claims 1, 11, 17-18, and 25 lack the practical application of producing a tangible result. (See *State Street Bank v. Signature Financial Group*). Examiner recommends including the recitation of "displaying said sampling pattern covering an array of pixels on a screen" in claims 1, 11, 17-18 and 25 to overcome this insufficiency. Thus, proper correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section

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351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-2, 8-10 are rejected under 35 U.S.C. 102(e) as being anticipated by

Leather. (6999100)

Regarding claim 1, Leather teaches a sampling pattern covering an array of pixels for use in an anti-aliasing system. (Fig. 9, Col 14 lines 23-51, Col 13 lines 10- 38, Fig. 6) It should be noted that the sampling pattern as taught by Leather is specified as a particular spatial distribution of multisamples within the pixel array, showing multisample locations within a pixel quad relative to the center pixel quad (Fig 9) with each sample having a specified x and y distance (units of 1/12 pixel) from the center of the quad. (Col 14 lines 42-51) Furthermore, Leather teaches where each pixel has a pattern of sample points at one or more than one mirror planes within the array of pixels, wherein the sample point pattern of each pixel is a mirror image and *different* from the pattern of a directly neighboring pixel. (Fig. 9, Col 14 lines 23-51). It should be noted that the pattern of sample points as taught by Leather is *mirrored or reflected* in both the x and y direction for each pixel of the pixel quad (pixel0, pixel1, pixel2, pixel3). (Fig. 9) For example, pixel0 is mirrored by mirror planes pixel1 and pixel2 respectively in the x and y direction (Fig. 9) and in addition pixel1 and pixel 2 are mirror images of pixel 0. Again it should be noted that the pattern of the mirror image (pixel1 and/or pixel2) is mirrored and also different from the pattern of its directly neighboring pixel. (pixel0)

Regarding claim 2, Leather teaches mirror planes are located on the edges of the pixel. (Fig. 9, Col 14 lines 23-51) It should be noted, for example, that mirror planes pixel1 and pixel2 are located and joined at the edges of neighboring pixel0.

Consider claim 8, Leather teaches the use of a sampling pattern according to claim 1 in a pixel anti-aliasing system. (Fig. 9, Col 14 lines 23-51, Col 13 lines 10- 38, Fig. 6)

Consider claim 9, Leather teaches using a sampling pattern for processing a still image. (Fig. 1, Col 8 line 61- Col 9 line 55) It should be noted that it is known in the art that a video sequence is simply frames of still images.

Consider claim 10, Leather teaches using a sampling pattern for processing a video sequence. (Fig. 1, Col 8 line 61- Col 9 line 55)

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 4-7, 11, 12-16, 17-18, 21-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Leather (6999100) in view of Nelson (6636218)

Claim 11 is similar in scope to claim 1 except for the recitation of pattern of sample points at the edges of the pixel. This is what Nelson teaches. (Fig. 4, Col 8 lines 4-21) It should be noted that Nelson teaches sampling each pixel at locations of (x.0, y.0), for example (1.0, 2.0) or (0.0, 0.0). It would have been obvious to one of ordinary

skill in the art at the present time the invention was made to combine the teachings of pattern of sample points at the edges of a pixel into the system of Leather because sampling at only the edges (corners) allows valid sample point values to be computed merely from adding or subtracting a parameter delta from a base position (starting point) (e.g. to step from one tile to the next requires only adding 4 times dpdy base position to go down to the next tile or adding or subtracting 4 times dpdx base position to go left or right of a given tile) (Col 8, 24-32) and thus, memory can be saved and/or more efficient processing time can be achieved.

Claim 17 is similar in scope to claim 11 except for the recitation of creating an anti-aliased image. Leather also teaches this. (Col 13 lines 10-51, Fig. 6) Thus, claim 17 is rejected under similar rationale as claim 11.

Claim 18 is similar in scope to claim 11 except for the recitation of a GPU. Leather also teaches this. (Fig. 2 and Fig. 3) Thus, claim 18 is rejected under similar rationale as claim 11.

Claim 25 is similar in scope to claim 11 except for the recitation of a computer program loadable into an internal memory associated with a CPU, said CPU being operatively coupled to a GPU. Leather also teaches this. (Fig. 2, Fig 3, Col 9 line 57-Col 10 line 53) Thus, claim 25 is rejected under similar rationale as claim 11.

Regarding claims 4, 13 and 21 Leather does not explicitly teach wherein the (x, y) coordinates of the sample points for a pixel are related according to (0, a), (a, 1), (b, 0) and (1, b). This is what Nelson teaches. (Fig. 4, Col 8 lines 4-21) It should be noted that if $a = 0$ and $b = 1$ (for e.g.) then Nelson teaches (0, 0), (0, 1), (1, 0), (1, 1) which are

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sampling points at the edges of the pixel corners. (Fig. 4) It would have been obvious to one of ordinary skill in the art at the present time the invention was made to combine the teachings of pattern of sampling points at the edges of a pixel into the system of Leather because sampling at only the edges (corners) allows valid sample point values to be computed merely from adding or subtracting a parameter delta from a base position (starting point) (e.g. to step from one tile to the next requires only adding 4 times $dpdy$ base position to go down to the next tile or adding or subtracting 4 times dpx base position to go left or right of a given tile) (Col 8, 24-32) and thus, memory can be saved and/or more efficient processing time can be achieved.

Regarding claims 5, 14 and 22 Leather does not explicitly teach wherein the (x, y) coordinates of the sample points for a pixel are related according to (0, b), (a, 0), (b, 1) and (1, a). This is what Nelson teaches. (Fig. 4, Col 8 lines 4-21) It should be noted that if $a = 1$ and $b = 0$ (for e.g.) then Nelson teaches (0, 0), (1, 0), (0, 1) and (1, 1) which are sampling points at the edges of the pixel corners. (Fig. 4) It would have been obvious to one of ordinary skill in the art at the present time the invention was made to combine the teachings of pattern of sampling points at the edges of a pixel into the system of Leather because sampling at only the edges (corners) allows valid sample point values to be computed merely from adding or subtracting a parameter delta from a base position (starting point) (e.g. to step from one tile to the next requires only adding 4 times $dpdy$ base position to go down to the next tile or adding or subtracting 4 times dpx base position to go left or right of a given tile) (Col 8, 24-32) and thus, memory can be saved and/or more efficient processing time can be achieved.

Regarding claims 6, 15 and 23 Leather does not explicitly teach sampling pattern wherein the sum of "a+b" is in the range of 0.5 – 1.5. This is what Nelson teaches. (Fig. 4, Col 8 lines 4-21) It should be noted that if $a = 0$ and $b = 1$, which gives corner sample points (0, 0), (0,1), (1, 0), (1,1) as taught by Nelson (Fig. 4) then the sum of "a+b" is in the range of 0.5 – 1.5. It would have been obvious to one of ordinary skill in the art at the present time the invention was made to combine the teachings of pattern of sampling points at the edges of a pixel into the system of Leather because sampling at only the edges (corners) allows valid sample point values to be computed merely from adding or subtracting a parameter delta from a base position (starting point) (e.g. to step from one tile to the next requires only adding 4 times dpdy base position to go down to the next tile or adding or subtracting 4 times dpdx base position to go left or right of a given tile) (Col 8, 24-32) and thus, memory can be saved and/or more efficient processing time can be achieved.

Regarding claim 12, Leather does not explicitly teach wherein the pattern has one sample point per pixel edge. This is what Nelson teaches. (Fig. 4, Col 8 lines 4-21) It should be noted that Nelson teaches two sample points per pixel edge (and thus, contains 1 sample point). (Fig. 4) It would have been obvious to one of ordinary skill in the art at the present time the invention was made to combine the teachings of pattern of sampling points at the edges of a pixel into the system of Leather because sampling at only the edges (corners) allows valid sample point values to be computed merely from adding or subtracting a parameter delta from a base position (starting point) (e.g. to step from one tile to the next requires only adding 4 times dpdy base position to go

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down to the next tile or adding or subtracting 4 times dpdx base position to go left or right of a given tile) (Col 8, 24-32) and thus, memory can be saved and/or more efficient processing time can be achieved.

Regarding claims 19-20, Leather teaches wherein the GPU is implemented in hardware and software. (Fig. 3 Col 10 line 54- Col 12 line 5)

Regarding claim 26, Leather teaches a computer program product embodied on a computer readable medium. (Fig. 2, Fig 3, Col 9 line 57-Col 10 line 53)

Consider claims 7, 16, and 24 neither Leather nor Nelson explicitly teaches wherein $a = 1/3$ and $b = 2/3$. However Nelson teaches the other valid sample points may be $(x.5, y.5)$ besides $(x.0, y.0)$ without departing from the scope of the embodiments of the present invention. (Col 8 lines 9-14) It should also be noted that applicant has not shown any advantage in the disclosure for explicitly utilizing values of $1/3$ and $2/3$ for a and b respectively. Therefore, examiner will assume any arbitrary values of a or b will produce similar results (as shown by Nelson $(x.5, y.5)$ or $(x.0, y.0)$). Thus, it would have been obvious to one of ordinary skill in the art at the present time the invention was made to combine the teachings of pattern of sampling points at the edges of a pixel as taught by Nelson into the system of Leather because sampling at only the edges (corners) allows valid sample point values to be computed merely from adding or subtracting a parameter delta from a base position (starting point) (e.g. to step from one tile to the next requires only adding 4 times dpdy base position to go down to the next tile or adding or subtracting 4 times dpdx base position to go left or right of a

given tile) (Col 8, 24-32) and thus, memory can be saved and/or more efficient processing time can be achieved.

Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Leather (6999100) in view of Ramani. (6731300)

Leather does not explicitly teach wherein the pattern has one sample point per pixel mirror plane. This is what Ramani teaches. (Col 11 lines 50-62, Fig. 13) It should be noted that Ramani teaches partitioning an array of area pixel elements with one sample position located in each area element. (Fig. 13, Col 11 lines 50-62) It would have been obvious to one of ordinary skill in the art at the present time the invention was made to combine the teachings of sampling one point per pixel into the system of Leather because generating sample radius estimates for pseudo-random configuration of sample positions may be achieved (Col 11 lines 56-58) and thus, interpolating estimates for radial distance of samples without burdensome root sum of squares computation to determine radial distance for each pixel (or sample) (Col 1 lines 42-60) can be realized.

Conclusion

Any inquiry concerning this communication or earlier communications from examiner should be directed to Kevin K Xu whose telephone number is 571-272-7747. The examiner can normally be reached on Monday-Friday from 9 AM – 5:30 PM.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Zimmerman can be reached on (571)-272-7653.

Information regarding the status of an application may be obtained from Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EB) at 866-217-9197 (toll-free).

KX

Kevin Xu

8/4/2006


ULKA CHAUHAN
SUPERVISORY PATENT EXAMINER